



# **Status on Mechanical Testing @ NASA GSFC**

## **Presented at the International Workshop on Test Philosophies, Standards and Methods**

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# Outline

- **Methods introduced in the last decade**
  - Force measurements/limiting for sine, random vibration and acoustic tests
  - Base driven modal surveys
  - Hydraulic Shaker (6 DOF)
  - New sine burst method
  - Non contact sensors
- **Perspectives**



## Force measurements/limiting

- Became standard practice in the last decade for components, subsystems, instruments and Spacecraft.
- On measurements channels used for:
  - *Time replication as a tool for input tailoring.*
  - *Base driven modal surveys*
  - *Acoustic test preceding random test*
- On limit channels on sine/random for real time notching

## Base Driven Modal Tests

- In the process of validating commercial and in house programs for modal parameter extraction (frequency, damping, shape)
- Updating information on several shakers / configurations to assess input motions correlation

### Hydraulic Shaker

- Developmental unit, potential use for base driven modal tests, multi-input tests.



## **New sine burst method**

- Applied already to flight hardware. Open loop time history input with assorted frequency content. Technique uses Fourier coefficients.

## **Non contact sensors**

- Measurements on light weight hardware (sun shades, panels) and filaments responses.

## Perspectives

- Follow up on base driven modal.
  - Experimental validation
  - Application using electromagnetic shakers or hydraulic shaker)
- Program for integration of pre-test analysis, planning, execution and reporting.
  - Shaker Swept Sine and Random A&T (Analysis & Test )
  - Shaker Shock Mode A&T
  - Shaker Base Driven Modal Survey A&T
  - Acoustic A&T
  - Static/Dynamic Balance A&T